

REPORT ON CONDITION AND VALUATION of PENSACOLA'S WATER WORKS SYSTEM

Made by
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Consulting Engineer

October 1, 1908.
Board of Bond Trustees of the City of Pensacola, Fla.

Gentlemen: In pursuance with my engagement by you to make a just and equitable appraisal of the value of the water works in the city of Pensacola, as owned and operated by the Pensacola Water Company, I beg to report that I visited the plant about August first of this year, and carefully examined the whole plant, making detailed examination of the power plant, reservoirs, wells, stand-pipe, tower and tank, dwelling houses belonging to the company, distribution system, including all valves and fire hydrants, and the book accounts in the hands of the Pensacola Water Company, with a view of placing a just and equitable value upon the whole concern, and beg to submit my following report and appraisal.

History of Plant.
On November 11th, 1885, the city of Pensacola, by an ordinance, entitled "An Ordinance to provide for a public and private supply of water, in and near the city of Pensacola, Florida, and granting to S. R. Bullock & Co., and their associates, successors or assigns, the right to construct, operate and maintain and own water works in said city, and contracting with them for water for fire protection and other purposes, and for the purchase of said works by the city," granted a franchise to the aforesaid Samuel R. Bullock & Co. to erect and operate a water plant. On December 15th, 1885, the Pensacola Water Company was incorporated under the laws of the state of Florida, for the express purpose of owning, operating and maintaining a water works for supplying the city of Pensacola and the inhabitants thereof with water for fire protection and for domestic and industrial consumption. This charter was granted by the state for a term of fifty years, and carried with it the authority to hold property and real estate to the value of \$300,000.00, and limited the indebtedness of the company to 50 per cent. in excess of its capital stock and bonded indebtedness.

The franchise granted by the ordinance of the city of Pensacola was given for a term of fifty years from November 11th, 1885.
The Pensacola Water Company purchased from S. R. Bullock & Co. the franchise alluded to and entered into agreement with said Bullock & Co. for the erection of the water plant under plans and specifications prepared by Mr. Clarence DeLafield, a civil engineer, employed by the Pensacola Water Company. The terms of said agreement provided that the water company was to pay the said Bullock & Co. for all his rights, title, and franchise, and for building the plant complete, the total bond issue of said water company amounting to 200 bonds of a par value of \$500.00 each, or \$100,000.00 par value, and in addition thereto 350 shares of its capital stock, with a par value of \$100.00 per share. The capital stock had no value, nothing having been subscribed to the treasury of the company on account of its issue, which issue amounted to 1500 shares. The bonds were thirty year bonds, bearing 6 per cent. interest per annum, due 1916, and were sold by Bullock & Co. to R. D. Wood of the city of Philadelphia, and are now held by the Bucknell estate, which is an heir to the R. D. Wood estate.

Original Plant.
The original plant, as built by S. R. Bullock & Co., consisted of the following:

Two 40-horse power horizontal return tubular boilers.

One feed water heater.

One Dean-Holyoke boiler feed pump.

Two two-million gallons compound condensing duplex pumps.

One brick power house, with stone trimmings 25x55.

One brick smoke stack, 100 feet high, 3 feet shaft.

One 6-inch well, 140 feet deep.

Steam and water fittings for boilers and pumps.

One frame dwelling for engineer.

One stand-pipe, iron, 20-feet diameter by 133 feet high on concrete foundation.

Five lots, 30x135, at corner of Palafox and Cervantes streets, upon which the stand-pipe was erected, and upon which a small frame dwelling was erected for engineer.

One power-house lot at corner of DeSoto and Tarragona street, 140x175.

6255 lineal feet of 12-inch cast iron forcing and distributing main, weighing 84 pounds the foot.

4,000 lineal feet of 6-inch cast iron distributing mains, weighing 33 pounds to the foot.

104 two-way Ludlow fire hydrants, connected with distributing mains with 6-inch cast iron pipe.

Five 12-inch Ludlow valves.

Twenty-two 6-inch Ludlow valves.

22.83 tons of special castings.

The piping system comprised 1175 feet of 12-inch forcing main from the power house to the stand-pipe and 5,086 feet of 12-inch distributing main on Palafox street from the stand-pipe to the north side of Main street, and 1,845 miles of 6-inch cast iron distributing mains.

Valuation of Waterworks Plant.

Cost of Reproducing Works	\$191,568.62
Less Depreciation of Plant	35,770.51
Physical Value of Plant	155,798.11
"Going" Value	16,894.94
Franchise Value	14,820.00
Total Value	\$187,513.05

Additions to Water Works.

Since 1886 the following additions to the original water plant have been made by the Pensacola Water Company:

46,435 lineal feet of 6-inch cast iron pipe.

4,400 lineal feet of 21-2-inch galvanized iron pipe.

500 lineal feet of 2-inch galvanized iron pipe.

2,760 lineal feet of 11-2-inch wrought iron pipe.

3,700 lineal feet of 11-4-inch wrought iron pipe.

Eighty-nine two-way fire hydrants, with connection to mains.

Forty-eight 6-inch gate valves.

One steel tower and tank, 22x39 feet, 100,000 gallons capacity.

One lot, 80x125, corner DeSoto and Eighth avenue, for tower and tank.

Two 80-h. p. Erie City return tubular boilers to replace two 40-h. p. boilers originally placed in power house.

One damper regulator.

Addition to power house, 10.2x58, of brick.

Thirteen 4-inch wells, 130 to 140 feet deep, with suction mains complete.

Five single acting Dean Holyoke steam pumps for pumping water from wells to reservoirs, with steam pipe and fittings connecting them with boilers.

Two brick reservoirs with shingle roofs, one 66x95 by 5.67 feet deep, the other 58.33x55 by 5.92 feet deep.

One lot 140x175, corner DeSoto and Guillemarde streets upon which reservoirs stand.

12x300 on Guillemarde street between DeSoto and Gonzalez streets, upon which several wells are driven.

One frame dwelling on above lot.

The distribution system, including foreign main, as it exists at this date, consists of:

6,255 lineal feet of 12-inch cast iron pipe.

38,435 lineal feet of 6-inch cast iron pipe.

4,400 lineal feet of 21-2-inch galvanized iron pipe.

500 lineal feet of 2-inch galvanized iron pipe.

2,760 lineal feet of 11-2-inch wrought iron pipe.

3,700 lineal feet of 11-4-inch wrought iron pipe.

193 two-way fire hydrants.

Thirty-two 6-inch gate valves.

Seventy 6-inch gate valves.

Or 19.83 miles of cast iron mains, and 2.15 miles of small branches from which the city of Pensacola derives its service. These small pipes being extended by the water company to remotely furnish water to its patrons in advance of the city's ordering fire protection.

Present Condition of Plant.

Upon carefully examining the water plant on or about August 1st, of the present year, the following condition was found to exist:

The 13 driven wells were said to have been overhauled and cleaned out in 1905, and were yielding a total of 1,156,866 gallons in 24 hours.

The total water consumption was computed from the strokes of the pumps made from August 1, 1905, to August 1, 1906, allowance being made for the tested slippage of the pumps, and found to be 189,270,577 gallons for the year. The maximum average daily consumption being 623,844 gallons, and the minimum average daily consumption being 440,411 gallons. There were 1906 taps connected with the distributing mains, which at a consumers per tap would make 9580 consumers. As the average daily consumption of water throughout the year was 518,546 gallons, this represents 54.5 gallons per capita per day. Upon this basis the present wells can supply a population of 21,227, no provision being made for water used for fire protection and sewer cleaning.

The two reservoirs were carefully examined and found to leak at the rate of 132,832 gallons in 24 hours, which deducted from the daily yield of the wells would leave 1,024,234 gallons of water available for consumption, sufficient to supply 18,000 persons, no provision being made for fire protection, flushing sewers or sprinkling streets.

The quality of the water which the wells yield is of the best, in fact it is

rare to find a municipal water supply of this magnitude so free from organic or mineral impurities.

Below is a chemical analysis of a sample of the water, as drawn by your engineer from the hydrant in the yard of the Keyser building, and the remarks made by the chemist who analyzed it, who is the official chemist and bacteriologist of the Wilmington water department, and a man with wide experience in making water examinations.

The power house is in fair condition, although within the next few years it will require a new roof and trusses and floor.

The brick stack, which was originally 100 feet high, including the pedestal, but 80 feet high, lightning having struck it several years ago, breaking off the top, but otherwise it is in good condition.

The two 40-h. p. boilers, which were erected with the plant in 1885 or 1886, were removed in 1902, and two 80-h. p. boilers of the same make were installed. The present condition of these boilers is good, except the setting, which is not in good condition, and needs early repairing.

One of the main pumps has its cast iron base broken, its engine end in poor condition, it having been damaged by the condensation of steam to a compound duplex, and thus its efficiency has been very much reduced. It cannot at this time pump 2,000,000 gallons of water per day against a head of 170 feet, or the natural head due to the top of the stand-pipe. Its output is only 10 per cent, about double what it should be.

The other pump seems to be in good condition, except its original design has been changed from compound condensing to duplex non-condensing, and hence has not the efficiency for which it was first intended. The slippage is about 5 per cent, or about 1,000,000 gallons of water per day.

The boiler-feed pump and heater are in fair condition, and will answer the purpose for some time to come, although the heater is too small to meet the requirements with efficiency, and should be replaced by a larger one.

The wells are in good condition, so far as your engineer could determine, although the water is being pumped from them in a very extravagant manner, consuming an abnormal volume of steam, and, of course, fuel.

The single acting pumps, used for pumping the water from the reservoirs, are in fair condition, although two of them have worn out plungers and cylinders on their water end, which will have to be renewed if this method of getting the water from the wells is continued.

While the two reservoirs have been built but a few years, they cannot be said to be in good condition, as the leakage is entirely too great, and as the daily consumption of water increases these leaks must be stopped, which may prove an expensive operation.

The roof of the power house, and will need constant repairs as long as this kind of roof is maintained over a reservoir. Wood will not last long when one side is constantly exposed to moisture and the other side to sun and air, and the repairs to these reservoirs may be expected to continue as long as a shingle roof is maintained.

The stand-pipe is in fair condition, although it needs painting very much, and upon examination there seems to be considerable oxidation of the iron of which it is composed, but on the whole it has many years yet to live.

The tower and tank is practically new, is of a first class design. Its only present need is a coat of paint.

The present condition of the distribution mains laid in 1884 is not so good as might have been expected from the quality of the water, which has been pumped through them. Before the reservoirs were erected the well water was pumped direct into the mains; this well water contained carbonate of iron, and some sulphate, which have combined with the iron in the pipes, making a ferric oxide. This is shown very clearly by opening the fire hydrants at almost every point upon the system, except on Palafox street. The water ejected is filled with iron rust from the pipes and although it may be allowed to run for fifteen minutes the oxide still comes out in large quantities. This oxide

has reduced greatly the carrying capacity of the distribution mains, hence their value. What is true of the original mains laid seems also to be true of those laid more recently.

Wherever the mains were dug up the outside was in excellent condition. Tests were made to determine electrolytic action, but none whatever was observed.

Many of the gate valves are in poor condition, and the same may be said of some of the fire hydrants, although as a rule the latter are in excellent condition.

The operating and maintenance expenses are extremely high, amounting to \$101.00 per million gallons pumped, whereas pumping plants of this character do the same work for from \$22.00 to \$38.00 per million gallons pumped, but a large share of this is due to the high salaries of the president and secretary which, under municipal control, would be entirely saved, so that under municipal control the Pensacola water works can be now much cheaper operated than under the present control.

The present condition of the water plant is due to the careful supervision of the president of water company, had it not been for this supervision the original equipment and plant would long ago have been overhauling.

Ability of Present Plant to Meet Present and Future Conditions.

As herein stated, the present wells yield sufficient water to accommodate a population of 21,227, based upon the present consumption per capita, but your engineer believes that these wells can be made to yield twice as much water, or at least the territory from which the wells now draw the water. This water stratum has now been used for twenty years and has passed the experimental age. The drawing upon one set of wells does not seem to lower the water horizon in the other set, showing that there is an abundance of water in the ground. With wells driven further apart and the water pumped therefrom by compressed air, the writer has estimated from the drainage area that this well will yield about 4 million gallons in 24 hours, or sufficient to accommodate a population of 40,000 persons, each using double the amount of water now being consumed. In fact, the writer believes the water supply, as owned by the Pensacola Water Co., is one of its most valuable assets, and should be taken into consideration in making the appraisal of its property.

The present population of Pensacola is estimated to be 25,000, and to accommodate this it will be necessary to increase the water supply to 18 miles for nearly double the present system.

The writer begs to call your attention to his tests made to determine the pressure on the water mains at various points in the system, and to the fact that the pressure on the fire hydrants with one nozzle closed and observing the pressure, then by opening both nozzles full, letting the water flow freely and observing the gauge under these conditions. The pressure with nozzle closed ran 35 pounds, and from 6 pounds to 38 pounds with nozzles opened. The stand-pipe and tower and tank were in normal condition, with reference to depth of water in them during the test. This test determined two things: that there were several sections of the city with poor fire protection, and that this was due to a reduced capacity of the original mains, and to an improper arrangement of the mains for fire protection. These present mains should have been arranged with larger pipes, and the city should have been protected by a larger stand-pipe and tower and tank, making an outside circuit, and the smaller six-inch and eight-inch mains being connected therewith in every direction, and until this is done the fire protection of the city will not be adequate to protect the property among upper classes of insurance risks.

The present tower and tank is being supplied by a six-inch main, several thousand feet long, and is delivering through a main of the same size, which is far from a good arrangement. At this point it may be well to call your attention to the terms of the franchise granted to S. R. Bullock & Co. by the authority of which the Pensacola Water Company is operating.

Section 6 specifies that the forcing main to the stand-pipe shall be 14 inches in diameter, and there shall be 650 feet of 10-inch pipe, and 12,500 feet of 8-inch pipe, whereas, as a matter of fact, the forcing main is 12 inches in diameter, and there is no 10-inch or 8-inch pipe in the distributing system, showing that the original plan upon which the franchise was granted was not carried out, which has resulted in greatly reducing the efficiency of the plant.

The writer, however, cannot see how you can now take advantage of this point, as the city of Pensacola, through its properly constituted authorities, accepted the plant in 1886, and stated that it satisfactorily fulfilled the terms of the ordinance. But

it is cited in this report, to show that the designing engineer had in his mind the furnishing of Pensacola with better fire protection than was subsequently done, and has some bearing on the present value of the plant.

In Section 16 of the ordinance, granting the said franchise, it is specified just what the plant shall be able to accomplish before it is accepted by the city, as ample for fire protection. This test was to be, among other things, the raising of the pressure in the pipes to 150 pounds per square inch. This test was undoubtedly required for fire protection, as the balance of this section clearly implies, and it is presumed that when the plant was accepted by the city, the plant met this condition. Section 12 provides that the grantee will continuously operate the said water works, keeping them in a maximum state of repair and efficiency; now if this means anything, it means that the maximum state of efficiency was that specified in the original test, hence your engineer attempted to get this test by putting off the stand-pipe and having the pumps run as rapidly as the owners would permit, with the result that 123 pounds pressure was all that could be obtained. This inability to meet the requirements of the franchise is lack of efficiency, and has some bearing in determining the present value of the plant, for in order to reach this maximum efficiency, a new and larger pump would have to be installed, which would add to the cost of the plant.

From the company's point of view, however, there are no immediate improvements necessary to hold the present revenue of the plant, although to increase this revenue to any marked extent would require large extensions to the distribution system, and if the city determined to require the company to give fire protection to the whole city, as the said city has needed for some time to do, it would require the additional investment of almost as much money as the present investment represents. These conditions somewhat simplify the computations for arriving at the value of the present plant, as but little account need be taken of increased revenue during the life of franchise, because to secure such increased revenue would require as much new capital as the increased revenue would represent.

Basis of Appraisal.
The writer has, in making this appraisal, closely followed the instructions of the United States court in the case of Kansas City vs. the National Water Works Company; those of the supreme court of the state of Maine, in the celebrated case of Kennebec vs. Maine Water Company et al, and his own experience, and has aimed to determine a just and equitable value.

It might be well to quote here briefly from the instructions of the court in the Kansas case, as they contain the writer's method of considering this valuation.

"Company not having an exclusive franchise, rates subject to legislative changes, to be considered in determining 'going value'."

"Value of reproducing present water plant by one substantially like it, not conclusive, but to be considered in proving present value."

"Because the plant is a going concern the value should be influenced to some extent."

"Value of franchise as entitling the company to do business as a going concern, to be considered, but not controlling or conclusive."

"Quantity and quality of water and service furnished. Fitness of plant and source of supply to meet reasonable requirements, present and future, to be considered."

"Capitalization of net income at reasonable rates cannot be adopted, as a sufficient or satisfactory test of present value; but while not a test, present and probable future earnings at reasonable rates are properly to be considered in determining present value of plant."

In determining the "going value," we consider the company is a going concern, with a profitable business established; that it has taken 20 years to establish the present business; that it took some time to construct the plant, and several years to bring its plant to the level of the present plant, with respect to business and income. In the meantime the business and income of the present company would either remain stationary or advance, and the difference between the business of this company and that of the city throughout this period reduced to its present worth at the time of appraisal, may be considered as fairly representing the "going value."

The franchise of the Pensacola Water Company has a special value beyond that usually held by water companies, this special value is represented by the contract it has made with the city of Pensacola for five hydrants, covering the entire period of its franchise. There may be some legal method of breaking this contract but the writer cannot imagine it, so long as the company continues to serve the city in accordance with the stipulations of the franchise, and he has therefore considered this contract binding upon both parties in determining the franchise value of the plant.

"The franchise value depends upon the plant's net earning power, present and prospective, developed and capable of development, and should be considered as value to the seller, not the buyer."

The writer has also considered the value of the plant on the basis of income per tap, using the present revenue and operating expenses as fairly representing the future value on this basis. Thus the value which he fixes is the average value estimated by

three different and distinct methods, each one of which is used by engineers in appraising values of water works.

In examining the books of the water company, it is found that while the gross income of the company has increased somewhat during the past six years, there has been but little difference in the net revenue, that of 1905 being less than 1902, and nearly the same as 1901, which may be the result of the epidemic of yellow fever during 1905. But the net revenue of 1904 was less by \$17,702.34 than it was in 1903, so that it is a matter of fact that the present revenue equals, or almost equals, the company's present facilities for doing business, and to increase same means large expenditure of money for betterments and additions as heretofore stated.

In determining the cost of reproducing the present plant, the present high price of materials and labor has been carefully considered and used, and, in determining the depreciation the writer has exercised the utmost care, each particular item of the plant being valued at its present cost, and the time in which it was installed, with its future probable efficient life, and he believes his determinations conservative.

In order to determine the value of the plant to the city, if purchased at the valuation fixed in this report, the writer has computed the valuation based upon this valuation plus the cost of putting the plant in a proper condition to meet the present requirements for fire protection, and based upon interest charges of 4 1/2 per cent. on 30 year bonds, with sinking fund of 4 1/2 per cent. to retire bonds.

It might be said here that the present water company has never created a sinking fund from its net earnings, although its bonds fall due in 1916, ten years hence. This fact alone decreases the value of the plant very materially in the seller's hands, as the present rate of business it would be impossible for the company to retire these bonds when they become due, except by the creation of a new debt, which it would not be possible to create if the city should build its own plant.

Valuation of Plant.
Value based upon cost of reproducing works, less depreciation, plus "going value," and franchise value.

Cost of reproducing works, \$191,568.62

Depreciation of plant 35,770.51

Physical value of plant 155,798.11

Going value 16,894.94

Franchise value 14,820.00

Total value upon this basis \$187,513.05

Value based upon capitalization of net earnings, based upon net earnings of 1903

1904, 1905 and 1906. Capital based on 6 per cent.

Interest and 30 year bonds and 4 1/2 per cent. sinking fund for same period \$212,819.24

Value based on income per tap, capital based on 6 per cent. interest on 30 year bonds and 4 1/2 per cent. sinking fund for same period 183,323.32

Divided by three 58,855.61

Total value of plant 194,551.87

Value of works when purchased by city.

Total value of works, as above given \$194,551.87

Cost necessary to supply ample fire protection to present plant 45,886.90

Annual consumption per 1,000 gallons \$59,270.00

At above rates consumed at 18.44 per 1,000 gallons, based on the years 1904 and 1905 34,587.06

Operating expenses, same years, 56 per cent. 19,507.32

Earnings over operating expenses 15,379.74

Fixed charges, 4 1/2 per cent. on \$240,238.77 10,810.74

Sinking fund, 4 1/2 per cent.

(Continued on Fifth Page.)

A Bad Sign

Irregularity is bad in every department of life, in meals, in sleeping hours, but especially when it is a question of womanly habit. Not only is it a sign of female disease, but, unless cured, it will cause dangerous troubles, because of the poisons thus allowed to remain in the system.

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